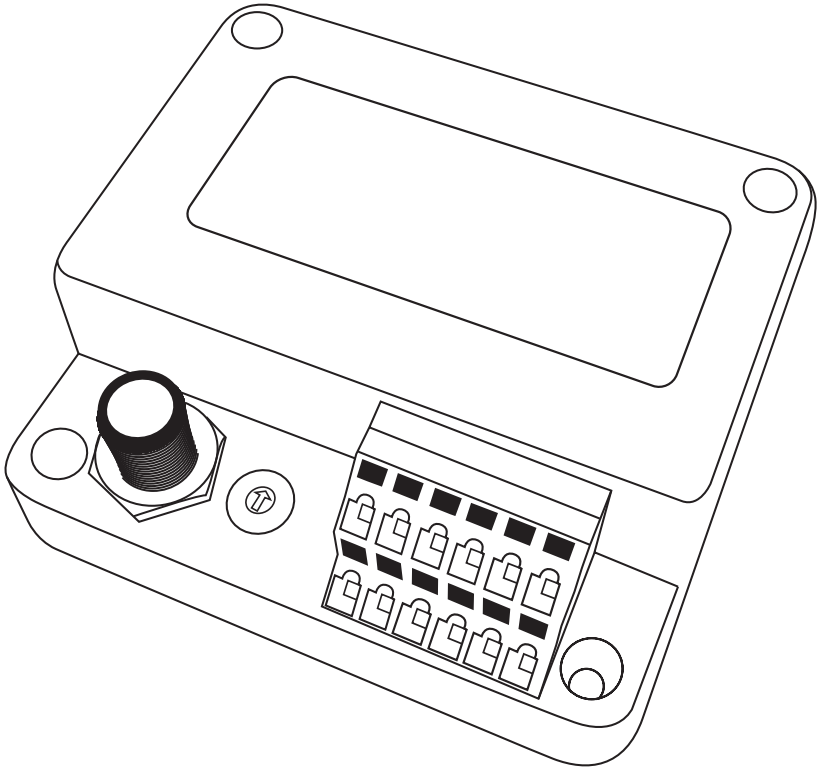
NMEA2000® DC MONITOR
Part Numbers: 3410
USER MANUAL



Revision 2.00

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1 INTRODUCTION

The Offshore System's NMEA2000® 3410 DC Monitor is designed to monitor any DC source including batteries, PV Cells or Wind Generators on the NMEA2000® network.
This unit is designed to operate in a protected marine environment such as an engine room. It is very important that it is installed and set up correctly according to this manual. Please read and follow the installation and setup instructions carefully to achieve the best results.

1.1 FIRMWARE REVISION

The information in this manual corresponds to firmware revision 2.00

1.2 PRODUCT FEATURES

The NMEA2000® 3410 DC Monitor has the following features:

- **Inputs from battery voltage, 200 Amp DC Current Transformer,500 Amp 50mV Shunt, 1200 Amp 50mV Shunt**
- **User Settable Device Instance using rotary switch**
- **Heartbeat blue LED confirming NMEA transmission.**
- **NMEA2000 micro C interface plug**
- **Panel or DIN rail mounting option**

The unit reports DC Voltage, DC Current and state of charge. It uses Peukart's Constant and the Charge Efficiency Factor for the battery to ensure the most accurate state of charge reporting.

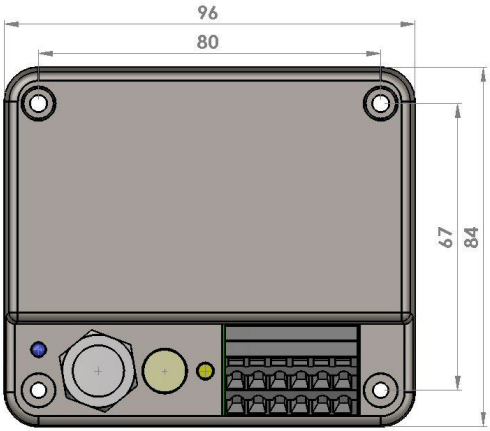
2 INSTALLATION

2.1 UNPACKING THE BOX

You will find the following items in the 3410 shipping box:
1 x 3410 NMEA2000® DC Monitor
1 x 3410 User Manual (This document)

2.2 MOUNTING THE UNIT

The unit should be mounted to a flat surface using 4 mounting screws. The unit dimensions and mounting hole locations are shown on the following drawing.



Note: Mount away from sources of condensation and moisture

2.3 CONNECTING THE NMEA2000 CABLE

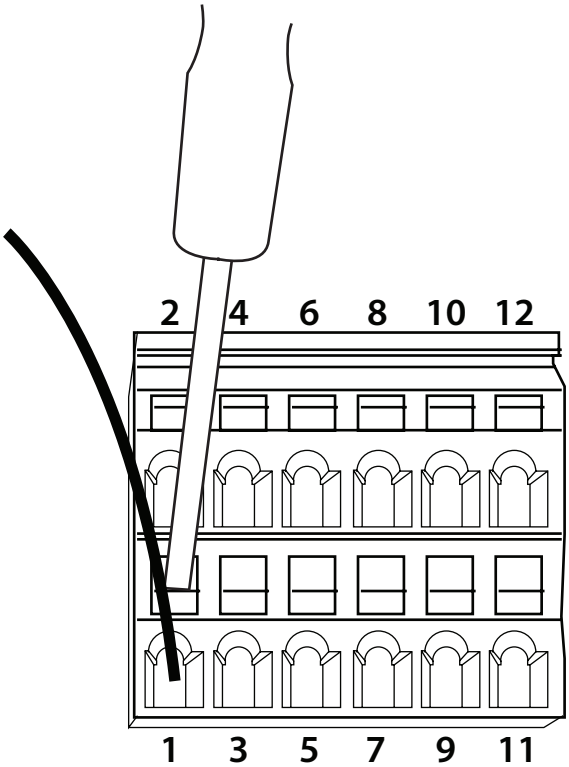
The unit is connected to the NMEA2000 network by the 5 way micro C socket on the front. Carefully attach the network drop cable to this plug and hand tighten until it it is fully seated. Take care to match the orientation of the pip inside the socket to the recess inside the drop cable plug. The other end of the drop cable should be connected to a suitable Tee connector on the NMEA2000 network backbone cable.

2.4 CONNECTING THE SENSOR CABLES TO THE WAGO SOCKET

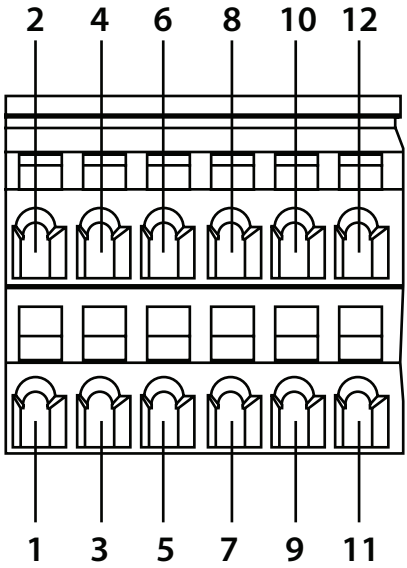
WARNING: Risk of Electric Shock

This device contains potentially hazardous voltages. Ensure that power is removed from all DC circuit that will be connected to the DC monitor. Do not attempt to disassemble the device. This device contains no user serviceable parts. Connecting the DC monitor must be performed by **QUALIFIED ELECTRONICS ENGINEER ONLY.**

The cables from the power-source to the external sockets are connected using the 6 x 2way WAGO Cage Clamp terminal block. The wire should be stripped for 8 mm and then the cage clamp opened with a small screwdriver in the slot above the wire connection. Then simply insert the wire into it's connection slot and release the cage clamp by removing the small screw driver. This will produce a secure gas tight connection on wire sizes from 0.08 – 2.5 mm^2



The terminal connections are numbered as follows:



Terminal 1	Battery Negative - Must be installed
Terminal 2	Battery Positive – Must be installed
Terminal 3	Current Transformer Black Wire
Terminal 4	Current Transformer Green Wire
Terminal 5	Current Transformer White Wire
Terminal 6	Current Transformer Red Wire
Terminal 7	Shunt Negative
Terminal 8	Shunt Positive
Terminal 9	
Terminal 10	
Terminal 11	No Connection
Terminal 12	No Connection

Please note the following important notes:

- **If you are using the 200A DC Current Transformer then do NOT install a current shunt as well.**
- **If the DC Current Transformer shows a charge when discharging or vice versa the reverse the direction of the current transformer on the DC Power cable.**
- **If the current shows a charge when discharging or vice versa simply exchange the sense wires on the shunts.**

3 CALIBRATING THE DC CURRENT TRANSFORMER & SHUNT

Before using the DC Monitor Current Transformer or Shunt for the first time the current input needs to be calibrated for the best accuracy. This is done by ensuring that there is NO current flowing through the centre of the transformer or the shunt.

Note that if a current transformer is connected, the device will detect it at power up.

To select the type of a shunt set the rotary switch to either A or B, then press and hold down the pushbutton for 5 seconds. To calibrate the current transformer or the shunt, set the rotary switch to C, ENSURING THERE IS NO CURRENT FLOW PRESENT, press and hold pushbutton for 5 seconds.

When the button is released then the unit will be calibrated and the blue LED will remain illuminated for a longer 2 second flash.

Rotary switch setting	Selection
A	1200 Amp Shunt
B	500 Amp Shunt
C	Calibrate

4 CONFIGURATION

The following items can be configured on the 3410.

4.1 DEVICE INSTANCE

It is possible to install 16 3410 DC Monitors on a NMEA2000® network so they need to each have a unique Device Instance Address. The Device Instance of each unit is set by turning the small rotary switch with a small screw driver. Valid Device Instances range from “0” through to “F”.

4.2 BATTERY TYPE

This can be set to either “Flooded/Wet”, “Gel”, “AGM” or “Other”. The unit is set to flooded as it leaves the factory and if it is desired to change it to a different value this can be done with a suitable Offshore Systems Display Unit.

4.3 NOMINAL VOLTAGE

This is the voltage reported over the NMEA2000 network and can be set to 12,24 or 32 Volts. It comes preset to 12 volts and can be changed to a different value with a suitable Offshore Systems Display Unit.

4.4 EQUALISATION

Used only for reporting over the NMEA2000 network this comes set to “Not Supported”. It can also be set to “Supported” with a suitable Offsore Systems Display Unit.

4.5 CALIBRATE TO FULL BATTERY

You must calibrate the device to report 100% charge at full charge. When the battery is fully charged, set rotary switch to F and press & hold for 5 seconds the pushbutton. When the button is released then the unit will be calibrated and the blue LED will remain illuminated for a longer 2 second flash.

4.6 PEUKERT EXPONENT

This can be set to a value between 1.0 and 1.5 and controls the state of charge calculation for the best accuracy. This can be set using a suitable Offshore Systems Display Unit. The default value is 1.25

4.7 CHARGE EFFICIENCY FACTOR

This can be set to a value between 5% and 100% to reflect the charging efficieny of the battery for the best state of charge accuracy. This can be set using a suitable Offshore Systems Display Unit. The default value is 95%.

4.8 BATTERY CAPACITY

This can be set using a suitable Offshore Systems Display Unit. For better accuracy, if Peukert exponent is greater than 1.0, the capacity set must be at 20 hour discharge. The default value is 100 Ah

5 STATE OF CHARGE RESETTING

The 3410 always calculates the remaining state of charge even when the NMEA2000 network is not powered. It resets the state of charge to 100% automatically, when the charging current drops below 5A whilst the charging voltage is above a threshold for 15 MINUTES. The unit can also be forced to the 100% value by setting rotary switch to F and pressing the small button next to the Device Instance switch for 5 seconds.

6 MAINTENANCE

- **Clean the unit with a soft cloth.**
- **Do not use chemical cleaners as they may remove paint or markings or may corrode the enclosure or seals.**
- **Ensure that the unit is mounted securely and cannot be moved relative to the mounting surface. If the unit is loose, tighten the mounting screws.**
- **Check the security of the cables connected to the NMEA 2000 connector, tighten if necessary.**
- **Check the security of the cables connected to the WAGO terminal block, reseating them if necessary.**

7 TECHNICAL SPECIFICATION

As Offshore Systems are constantly improving their products specifications are subject to change without notice. Offshore System's products are designed to be accurate and reliable however they should only be used as aids to navigation and not as a replacement for traditional navigation aids and techniques.

Certifications

Parameter	Comment
NMEA2000	Level B
Maritime Nav and RadioComm Equipment	IEC60945
CE and FCC	Electromagnetic Compatibility

NMEA2000® Parameter Group Numbers (PGNs)

Type	PGN No	PGN Name
Monitor	PGN127506	DC Detailed Status
	PGN127508	Battery Status
	PGN127513	Battery Configuration Status
Protocol	PGN126464	Tx/Rx PGN List
	PGN126996	Product Information
	PGN059392	ISO Acknowledge
	PGN059904	ISO Request
	PGN060928	ISO Address Claim
	PGN126208	Command/Request Group

Electrical and Mechanical

Parameter	Value	Comment
Battery Voltage Range	9~40 Volts	DC Voltage
NMEA2000 Voltage	12~24 Volts	DC Voltage
Power Consumption	30mA	Average Operating
Load Equivalence Number	1	LEN
Reverse Battery Protection	Yes	Indefinately
Load Dump Protection	Yes	SAE J1113
Size	mm	96 x 84 x 35
Weight	gr	120

Environmental

Parameter	Value
IEC 60954 Classification	Protected
Degree of Protection	IP40
Operating Temperature	-25˚C to 50˚C
Storage Temperature	-40˚C to 70˚C
Relative Humidity	93%RH @40˚ per IEC60945-8.2
Vibration	2-13.2Hz @ ±1mm, 13.2-100Hz @ 7m/s2 per IEC 60945-8.7
Electromagnetic Emission	Conducted and Radiated Emission per IEC 60945-9
Electromagnetic Immunity	Conducted, Radiated, Supply, and ESD per IEC 60945-10
Safety Precautions	Dangerous Voltage, Electromagnetic Radio Frequency per IEC 60945-12

8 WARRANTY

Offshore Systems warrants this product to be free from defects in materials and workmanship for one year from the date of original purchase. If within the applicable period any such products shall be proved to Offshore Systems satisfaction to fail to meet the above limited warranty, such products shall be repaired or replaced at Offshore Systems option. Purchaser's exclusive remedy and Offshore Systems sole obligation hereunder, provided product is returned pursuant to the return requirements below, shall be limited to the repair or replacement, at Offshore Systems option, of any product not meeting the above limited warranty and which is returned to Offshore Systems; or if Offshore Systems is unable to deliver a replacement that is free from defects in materials or workmanship, Purchaser's payment for such product will be refunded. Offshore Systems assumes no liability whatsoever for expenses of removing any defective product or part, or for installing the repaired product or part or a replacement therefore or for any loss or damage to equipment in connection with which Offshore Systems products or parts shall be used. The foregoing warranties shall not apply with respect to products subjected to negligence, misuse, misapplication, accident, damages by circumstances beyond Offshore Systems control, to improper installation, operation, maintenance, or storage, or to other than normal use or service.

THE FOREGOING WARRANTIES ARE EXPRESSLY IN LIEU OF AND EXCLUDES ALL OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR A PARTICULAR PURPOSE.

Statements made by any person, including representatives of Offshore Systems, which are inconsistent or in conflict with the terms of this Limited Warranty, shall not be binding upon Offshore Systems unless reduced to writing and approved by an officer of Offshore Systems.

IN NO CASE WILL OFFSHORE SYSTEMS BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, DAMAGES FOR LOSS OF USE, LOSS OF ANTICIPATED PROFITS OR SAVINGS, OR ANY OTHER LOSS INCURRED BECAUSE OF INTERRUPTION OF SERVICE. IN NO EVENT SHALL OFFSHORE SYSTEMS AGGREGATE LIABILITY EXCEED THE PURCHASE PRICE OF THE PRODUCT(S) INVOLVED. OFFSHORE SYSTEMS SHALL NOT BE SUBJECT TO ANY OTHER OBLIGATIONS OR LIABILITIES, WHETHER ARISING OUT OF BREACH OF CONTRACT OR WARRANTY, TORT (INCLUDING NEGLIGENCE), OR OTHER THEORIES OF LAW WITH RESPECT TO PRODUCTS SOLD OR SERVICES RENDERED BY OFFSHORE SYSTEMS, OR ANY UNDERTAKINGS, ACTS OR OMISSIONS RELATING THERETO.

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WARRANTY RETURN PROCEDURE

To apply for warranty claims, contact Offshore Systems or one of its dealers to describe the problem and determine the appropriate course of action. If a return is necessary, place the product in its original packaging together with proof of purchase and send to an Authorized Offshore Systems Service Location. You are responsible for all shipping and insurance charges. Offshore Systems will return the replaced or repaired product with all shipping and handling prepaid except for requests requiring expedited shipping (i.e. overnight shipments). Failure to follow this warranty return procedure could result in the product's warranty becoming null and void.

Offshore Systems reserves the right to modify or replace, at its sole discretion, without prior notification, the warranty listed above.

9 TECHNICAL SUPPORT

If you require technical support for any Offshore Systems products you can reach us using any of the following ways:

- Tel: +44(0)1425 610022
- Fax: +44(0)1425 614794
- Email: support@osukl.com
- Web: www.osukl.com
- Post: Offshore Systems UK Ltd
  Unit 10-11 Milton Business Centre
  Wick Drive, New Milton, Hampshire BH25 6RH

Offshore Systems (UK) Ltd
Unit 10-11 Milton Business Centre, Wick Drive,
New Milton, Hampshire, BH25 6RH, United Kingdom

Tel: +44(0)1425 610022 Fax: +44(0)1425 614794
Email: sales@osukl.com Web: www.osukl.com

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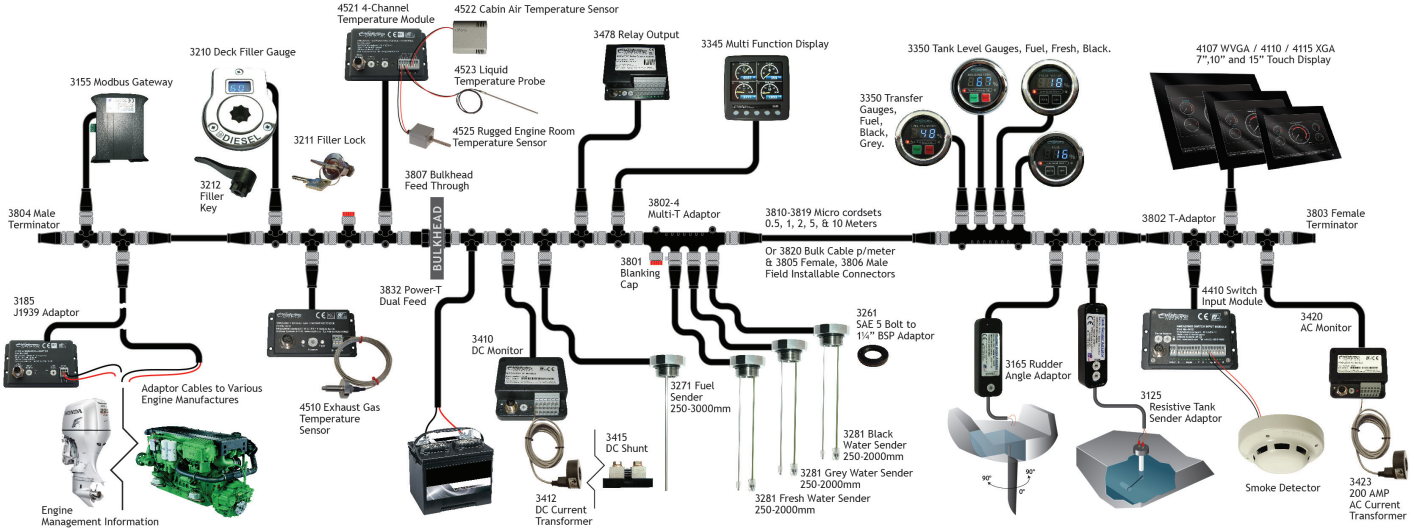
OFFSHORE SYSTEMS PRODUCT MAP

NMEA2000® VESSEL MONITORING AND CONTROL SYSTEMS


4521 4-Channel Temperature Module
4522 Cabin Air Temperature Sensor
3210 Deck Filler Gauge
3478 Relay Output
3345 Multi Function Display
3350 Tank Level Gauges, Fuel, Fresh, Black.
4107 WVGA / 4110 / 4115 XGA 7",10" and 15" Touch Display
3155 Modbus Gateway
4523 Liquid Temperature Probe
3350 Transfer Gauges, Fuel, Black, Grey.
3211 Filler Lock
4525 Rugged Engine Room Temperature Sensor
3212 Filler Key
3807 Bulkhead Feed Through
3804 Male Terminator
3802-4 Multi-T Adaptor
3810-3819 Micro cordsets 0.5, 1, 2, 5, & 10 Meters
3802 T-Adaptor
3803 Female Terminator
BULKHEAD
Or 3820 Bulk Cable p/meter & 3805 Female, 3806 Male Field Installable Connectors
3801 Blanking Cap
3185 J1939 Adaptor
3832 Power-T Dual Feed
3261 SAE 5 Bolt to 1¼" BSP Adaptor
4410 Switch Input Module
3420 AC Monitor
3410 DC Monitor
3165 Rudder Angle Adaptor
3125 Resistive Tank Sender Adaptor
Adaptor Cables to Various Engine Manufactures
4510 Exhaust Gas Temperature Sensor
3271 Fuel Sender 250-3000mm
3281 Black Water Sender 250-2000mm
3281 Grey Water Sender 250-2000mm
3281 Fresh Water Sender 250-2000mm
3415 DC Shunt
Smoke Detector
3412 DC Current Transformer
3423 200 AMP AC Current Transformer
Engine Management Information

Up to 16 each type of Sender can be installed on a single network